

Enabling Larger Deployable Ka-Band Antenna Apertures with Novel Rib, Phase I

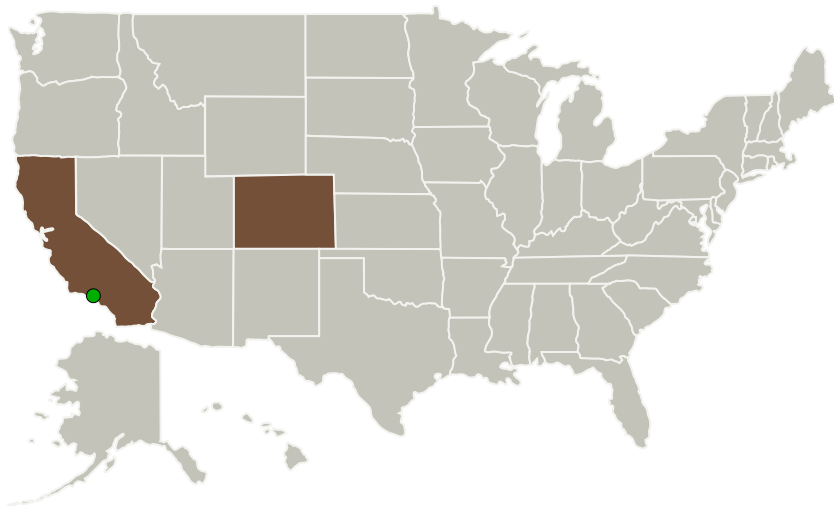
Completed Technology Project (2017 - 2017)



Project Introduction

The significance and relevance of the proposed innovation is to design and develop a novel rib that will enable larger aperture parabolic reflectors and antennas. The gain and performance of any reflector is a function of the diameter. Higher communication data rates, longer transmission distances, increased sensor capacity for active radar and radiometers are all directly related to aperture size. The challenge is being able to achieve these larger apertures and still have the packaging efficiency to enable more cost effective small satellites. Tendeg has designed, fabricated and surface tested a 1m aperture Ka-band reflector that is able to package into a 3U cubesat volume. The unique design allows 100:1 area compaction ratios yet the deployed antenna is achieving the surface precision needed for Ka-band operations. Scaling to larger apertures will require a new rib design. Trade studies will consider multiple cross sections, materials and fabrication methods. One configuration is the mini-CTM under development at Langley Research Center. Detailed design will be completed to optimize the integration of each potential rib configuration. Finite element analysis will determine stiffness during deployment and deployed buckling capacity. Testing of a mini-CTM will be done to determine packaging and buckling performance. At the completion of the program a down selected design will be proposed for a Phase II prototype program.

Primary U.S. Work Locations and Key Partners



Enabling Larger Deployable Ka-Band Antenna Apertures with Novel Rib, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Tendeg LLC	Lead Organization	Industry Small Disadvantaged Business (SDB)	Louisville, Colorado
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California	Colorado
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Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/136725>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tendeg LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

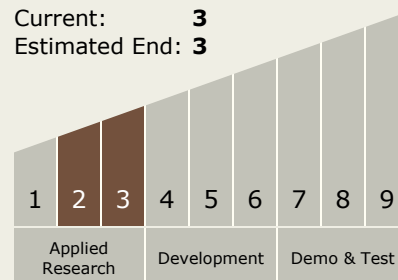
Carlos Torrez

Principal Investigator:

Gregg Freebury

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves